ORIGINAL

Before the
FEDERAL COMMUNICATION COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Rulemaking to Amend Part 1 and Part 21	)	CC Docket No. 92-297
of the Commission's Rules to Redesignate	)	
the 27.5 - 29.5 GHz Frequency Band and	)	RM-7872;
to Establish Rules and Policies for	)	RM-7722
Local Multipoint Distribution Service	)	

APPLICATION TO PARTICIPATE IN NEGOTIATED RULEMAKING

Texas Instruments Incorporated ("TI"), by its attorneys, hereby submits its application for membership in the negotiated rulemaking in the above captioned proceeding.[1] As detailed below, Texas Instruments supports the Commission's plans to employ negotiated rulemaking procedures to develop the technical rules for the sharing of spectrum between Local Multipoint Distribution Services ("LMDS") and fixed satellite services. In such respects, Texas Instruments would be substantially affected by the rules and its interests are not currently represented by the proposed members. Therefore, grant of Texas Instruments' request for inclusion in the negotiating committee would serve the public interest.

[1] This application is submitted in response to the Public Notice in CC Docket No. 92-297 (Feb. 11, 1994), 59 Fed. Reg. 7961 (Feb. 17, 1994) ("Public Notice").

I. A NEGOTIATED RULEMAKING IS A SUITABLE PROCEDURE FOR THE DEVELOPMENT OF TECHNICAL REGULATIONS TO GOVERN THE LOCAL MULTIPOINT DISTRIBUTION SERVICE AND FIXED SATELLITE USE OF THE 28 GHz BAND.

Negotiated rulemakings are conducted pursuant to the Federal Advisory Committee Act,[2] the Negotiated Rulemaking Act (NRA),[3] and the Administrative Procedure Act (APA).[4] Pursuant to these statutes, the Commission must consider, *inter alia*, the following factors before instituting a negotiated rulemaking:

- Whether "there are a limited number of identifiable interests that will be significantly affected by the rule;"
- Whether there is "a reasonable likelihood" that a negotiation committee can be assembled with a "balanced representation" of the interests identified above and whose members are "willing to negotiate in good faith to reach a consensus on the proposed rule;"
- Whether there is a "reasonable likelihood" that consensus will be reached in a "fixed period of time;"
- Whether the procedure would delay adoption of a final rule;

Texas Instruments supports the Commission's tentative conclusion that the development of rules for the provision of Local Multipoint Distribution Services meets the above criteria. First, the highly technical issues involved in coordinating the use of the 27.5-29.5 GHz band among various services, necessarily involves expertise and

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[2] 5 U.S.C. App. 2

[3] 5 U.S.C. §§ 581-590.

[4] 5 U.S.C. § 553 et. seq.

interests possessed by a limited segment of the telecommunications industry. Second, there is a reasonable likelihood that technical consensus can be achieved through the "give and take" of the negotiation process which is better suited to reaching engineering solutions than the exchange of comments and *ex parte* presentations by each interested party.

Third, the negotiated rulemaking in this context can realistically reach consensus in a fixed period of time because it affords an opportunity for the resolution of conflicts more rapidly with a greater probability of acceptance of the results than the more traditional approach. Indeed, even if consensus were not achieved, the record developed in the negotiation and the exchange of ideas should set the stage for the expeditious conclusion of the proceeding. For these reasons, Texas Instruments supports the Commission's proposal to utilize a negotiated rulemaking process for the development of rules in the 28 GHz band.

II. TEXAS INSTRUMENTS SHOULD BE INCLUDED IN THE NEGOTIATION PROCESS BECAUSE ITS EXPERTISE IN ENGINEERING AND MANUFACTURING TECHNOLOGY CRITICAL TO LMDS IS CRUCIAL TO THE RAPID DEVELOPMENT AND DEPLOYMENT OF LMDS EQUIPMENT.

The redesignation of the previously fallow 28 GHz band for LMDS provides spectrum for innovative multichannel video, voice and data services. However, due to the advanced technology that underlies LMDS, transforming the concept into a reality will require overcoming significant design and manufacturing challenges. As discussed below, Texas Instruments has the financial, technical and manufacturing resources to

assist the Commission in reaching sound solutions and to produce such publicly beneficial systems.

A. Texas Instruments Has The Financial, Technical And Manufacturing Resources To Produce Systems To Serve The LMDS Market.

Since its inception in 1930, Texas Instruments has developed into one of the largest high-technology companies in the world. Its scientists and engineers developed the technologies that have fueled the microelectronics revolution.[5] Through their efforts, Texas Instruments is recognized as a leading innovator in the development and provision of defense electronics systems, software productivity tools, custom engineering and manufacturing services, electrical controls, and metallurgical materials. In terms of service quality, TI is unrivaled, as demonstrated by the recent receipt of the Malcom Baldridge award for commitment to quality by its Defense Systems and Electronics Group -- the TI group submitting this application.

In particular, Texas Instruments possesses specific technical and manufacturing experience that is crucial to the development and manufacture of LMDS systems. For example, TI has extensive background with millimeter-wave technology, and operates one of the world's largest manufacturing facilities of Gallium Arsenide ("GaAs") semiconductor devices for over 25 years.[6] TI's expertise in semiconductor products includes the development of digital compression devices for both audio and video

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[5] See Key Events in TI History, attached as Exhibit A.

[6] Recent advances in GaAs performance have resulted in stable operations with low power consumption to make possible commercial millimeter-wave designs.

products. As an innovator in digital signal processing, TI has provided fundamental technologies for communications, HDTV, direct broadcast satellite, and set-top decoder boxes for digital cable transmission systems. All of these skills and capabilities are essential to the success of LMDS.

In addition to its ability to develop and manufacture LMDS equipment, Texas Instruments also has produced many complex systems that interoperate with other systems. With this expertise, TI can provide important insight into the feasibility and logistics of band sharing between LMDS and satellite services. Because TI has worked with NASA and the Department of Defense in the development of hardware for use in satellite systems, it has a sophisticated understanding of the issues related to satellite communications. TI also has the know-how required for the cost-effective development and manufacture of consumer and commercial products essential to the widespread deployment of LMDS technology.

Texas Instruments is committed to applying its extensive background in the development of high-technology products toward the development of a LMDS system. During the last year TI has conducted a variety of research and development activities relating to extremely high frequency operation and its application to LMDS, point-to-point and point-to-multipoint communications. These efforts include system architecture design, development of frequency plans for two way systems, indoor and outdoor antenna testing and evaluation, propagation testing and design of GaAS monolithic microwave integrated circuits (MMICs) and video compression devices for LMDS applications.

B. Texas Instruments Should Be Included In The Negotiating Process Because It Would Be Substantially Affected By The Adopted Rules And Its Interests Are Not Currently Represented.

Because of its technical and manufacturing background, Texas Instruments would bring invaluable insight and expertise to the negotiating committee. In determining whether an entity should be included in the negotiating group, the Commission must consider "whether that entity would be substantially affected by the rule and whether that entity is already adequately represented in the negotiating group."[7] Texas Instruments satisfies both of these criteria, and therefore, should be added to the negotiating committee.

1. Texas Instruments would be substantially affected by the adopted rule.

As a major developer and manufacturer of systems for LMDS applications, Texas Instruments would clearly be affected by the proposed rules. The LMDS technical rules will include the specifications necessary for equipment type acceptance and will affect the market acceptance of the equipment. To these ends, the proposed rules will inevitably address a variety of proposals for standards for power, modulation requirements, channelization, bandwidth, emission characteristics, frequency stability, and antenna characteristics such as gain, beamwidth, height and polarization. Obviously, the outcome of Commission choices could have a substantial impact on

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[7] Public Notice ¶ 11.

Texas Instruments as a potential provider of LMDS equipment. Indeed, the Commission has explicitly identified equipment developers and manufacturers as entities that would be significantly affected by the proposed rules.[8]

2. Texas Instruments' interests are not currently represented on the negotiating committee.

The success of the negotiated rulemaking process depends upon the balanced representation of interested parties.[9] To this end, it is essential that the negotiating committee include members with a breadth of relevant experience. In the context of the LMDS manufacturers, the ultimate rules should accommodate a variety of systems. A parochial approach to the development of the rules will result in a more limited choice of technologies and service capabilities to the detriment of the public. Hence, a reasonable diversity of interests must be present in the negotiating process to ensure a broader industry consensus, which will in turn expedite the issuance of final rules.

The representatives for the LMDS equipment manufacturing arena should include both small entrepreneurial entities and established technical companies. Currently, there is no representation from the latter category. As demonstrated earlier,

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[8] Id. at ¶ 7.

[9] Id. at ¶ 4.

Texas Instruments can provide a comprehensive perspective that is crucial to a well balanced negotiation team. In particular, TI can offer insight into issues that will affect system costs, performance, and interoperability. Moreover, the information obtained as a result of its research activity will provide data to address key issues such as propagation, interference, antenna gains, antenna beamwidth, radiated power and foliage attenuation.

Texas Instruments' designated representative would be a senior member of TI's technical staff. In addition to being well versed in the issues likely to arise in the negotiations, TI's representative would have the ability to mobilize the company's resources in order to assist in the resolution of issues faced in the negotiations.

III. CONCLUSION

The Commission has an opportunity to expedite the creation of an important component of a more competitive national information infrastructure. Texas Instruments urges the Commission to move forward with the proposed negotiated

rulemaking. TI also seeks permission to assist in the development of solutions to technical problems facing the Commission through membership on the negotiating committee. If selected, Texas Instruments certifies that its participation will be in good faith and consistent with the Commission's public interest objectives.

Respectfully submitted,

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March 21, 1994

I, William L. Eversole in my capacity as Strategic Development, Defense Systems & Electronics Group, hereby declare under penalty of perjury that I am familiar with the plans and technology that Texas Instruments Incorporated has in support of the proposed local multipoint distribution service. I have read the attached Application to Participate in Negotiated Rulemaking and certify that, to the best of my knowledge, the statements of fact made therein are true and correct.

William L. Eversole

William L. Eversole

Date: 21 March 1994

KEY EVENTS IN TI HISTORY

1930
- May 16: Founded as "Geophysical Service," first independent contractor specializing in reflection seismograph method of exploration. Founders J. Clarence ("Doc") Karcher and Eugene McDermott. Cecil Green and Erik Jonsson among first employees. Estimated revenues $300,000.

1938
- Eugene McDermott, chairman; Erik Jonsson, president of GSI.

1939
- Name changed to Coronado Corporation, with Geophysical Service Inc. (GSI) as subsidiary of Coronado.

1941
- December 6: GSI purchased by Green, Jonsson, McDermott, and H.B. Peacock.
- Receives first U.S. Navy contract for submarine-detection equipment.

1942
- Beginning of DSEG with electronic work for U.S. Army Signal Corps and U.S. Navy.

1945
- Pat Haggerty joins TI.

1946
- Establishes Laboratory and Manufacturing Division.

1948
- Receives first airborne radar system contract.

1950
- Total revenues $7.6 million; employees 1,128.

1951
- Name changed to Texas Instruments Incorporated (TI); GSI becomes wholly owned subsidiary of TI. Eugene McDermott first chairman of TI; Erik Jonsson first TI president.

1952
- Purchases license from Western Electric Company to manufacture transistors; enters semiconductor business.
- First formal planning conference held.

1953
- Listed on New York Stock Exchange (TXN) via merger with Intercontinental Rubber Company.
- Semiconductor Products Division and Central Research Division established.
- Acquires Houston Technical Laboratories.

1954
- Produces first commercial silicon transistor.
- First mass-produced high-frequency germanium transistor.
- First commercial transistor radio, Regency, designed by TI and built and marketed by IDEA Corp.

1955
- Expressway site in Dallas purchased.
- First U.S. Air Force side-looking radar contract.

1956
- U.K. subsidiary, Texas Instruments Limited, established; begins manufacturing semiconductors in Bedford, England, in 1957 (first semiconductor manufacture outside United States).

1957
- "Explorer," first U.S. orbiting satellite, contains TI transistors.
- TI Italia S.p.A. incorporated.

1958
- Semiconductor Building dedicated on Dallas expressway site.
- First integrated circuit (IC) demonstrated by inventor Jack Kilby.
- Begins development of terrain-following radar.
- Pat Haggerty becomes TI president; Erik Jonsson becomes chairman of board.

1959
- Merges with Metals & Controls Corporation, acquiring operations in Attleboro, MA, Versailles, KY, and in Holland, Italy, France, Mexico, Argentina, and Australia.

Key Events in TI History

1960
- Total revenues $232.7 million; 16,881 employees.
- TI France incorporated to manufacture and market semiconductors for European Common Market.

1961
- Delivers first integrated circuit computer to U.S. Air Force.
- Receives first Shrike missile contract.
- Texas Instruments France begins operations in Nice (incorporated in 1960).
- Texas Instruments Deutschland incorporated.
- First TI ethics booklet, "Ethics in the Business of TI," published.

1962
- Establishes OST System (Objectives, Strategies, Tactics).
- Integrated circuits used in Minuteman missile.
- Introduces digital seismic technology.
- Texas Instrumentos Eletronicos do Brasil Limitada incorporated.

1963
- Five-for-four stock split (November 27).

1964
- Produces first uncooled infrared imager for forward-looking infrared systems.
- Produces first plastic-packaged ICs.
- First consumer product containing ICs (hearing aid).
- U.S. Air Force Minuteman II first missile with fully integrated microelectronics system.
- TI Asia Limited incorporated.

1965
- Receives first contract for supplying clad metal for U.S. coins.
- Invents semiconductor-based thermal printer.
- Completes M&C plants in Aversa, Italy, and Central Lake, Michigan.
- Begins development of laser guidance system for targeting weapons (Paveway).
- Receives first contract for terrain-following radar.

1966
- Begins semiconductor production in Freising, Germany.
- Erik Jonsson retires as TI board chairman and becomes honorary chairman (December 31).
- Two-for-one stock split (April 29).

1967
- Pat Haggerty becomes TI chairman; Mark Shepherd becomes TI president (January 1).
- Invents electronic handheld calculator.
- Demonstrates first solid-state radar.

1968
- TI Japan Limited incorporated; begins manufacturing semiconductors in Hatogaya, Japan.
- TI Singapore (Pte) Limited incorporated.

1969
- Apollo mission lands first men on the moon with the aid of TI precision switches, thermostats, transistors, and other semiconductor products.
- Delivers first laser-guidance systems for missile guidance to U.S. Air Force.
- Announces Silent 700™ data terminal, first to use thermal printing technology.
- Invents automated thermocompression wire-bonding method for IC assembly.
- TI Taiwan Limited incorporated.

1970
- Total revenues $827.6 million; 44,752 employees.

1971
- Invents single-chip microprocessor and single-chip microcomputer.
- Introduces first portable data terminal, Silent 700™ Model 725.

1972
- Enters consumer electronics market with Datamath™ handheld calculator.
- Produces first ABACUS-II wire bonder, enabling high-volume IC production.
- TI Malaysia Sdn. Bhd. incorporated.

Key Events in TI History

1973
- Introduces 4K-bit dynamic random-access memory (DRAM) chip.
- TI Equipamento Electronico Lda. (Portugal) incorporated.
- Two-for-one stock split (April 30).

1974
- Introduces TMS1000 one-chip microcomputer.
- Receives first contract for High-speed Antiradiation Missile (HARM).
- Texas Instruments Belgium incorporated.

1975
- Introduces three-dimensional (3D) seismic data processing technology.

1976
- Pat Haggerty retires as TI chairman and becomes honorary chairman; Mark Shepherd becomes TI chairman; J. Fred Bucy becomes TI president.

1977
- Introduces OMNI 800™ Model 810 printer.

1978
- Introduces first single-chip speech synthesizer; first product (Speak & Spell™) incorporating low-cost speech synthesis technology.

1979
- TI Philippines incorporated.

1980
- Net revenues $4.1 billion; 89,875 employees.

1982
- Introduces first single-chip digital signal processor.

1984
- Introduces first multiport video random-access memory chip.
- Plant opened in Aguascalientes, Mexico, for manufacture of electromechanical controls.

1985
- Introduces first 4-megabit DRAM using fully integrated trench memory cell.
- Demonstrates first single-chip gallium arsenide phased array radar module.
- TI India (Private) Limited incorporated; begins producing CAD software in Bangalore in 1986.
- TI Japan facility in Hiji first U.S. wholly owned company to win Deming Prize.
- J. Fred Bucy retires from TI; Jerry Junkins becomes president and chief executive officer.

1986
- Receives first contract for development of "fire-and-forget" weapon system (Javelin).

1987
- Produces first single-chip 32-bit artificial-intelligence microprocessor.
- Begins semiconductor manufacturing in Aguascalientes, Mexico.
- Acquires control systems and industrial systems businesses of Rexnord Automation, Inc.
- Enters commercial software market with Information Engineering Facility™ (IEF™) integrated CASE toolset.
- Three-for-one stock split (May 15).

1988
- Demonstrates first quantum-effect transistor.
- Demonstrates first IC with silicon and gallium arsenide components fabricated on same chip.
- Announces Texas Instruments Registration and Identification System (TIRIS™) for automatic radio-frequency identification.
- Enters agreement with Hitachi Ltd. for development of 16-megabit DRAM technology.
- TI Korea Ltd. incorporated.
- TI stock listed on exchanges in London and Switzerland.
- Sells majority interest in Geophysical Service Inc. subsidiary (GSI) to Halliburton Company.
- Mark Shepherd retires as TI chairman; president and CEO Jerry Junkins named chairman.

Key Events in TI History

1989
- Forms joint venture with Acer Incorporated to manufacture advanced semiconductors in Taiwan.
- Announces construction of advanced semiconductor manufacturing facility in Avezzano, Italy, as part of $1.2 billion investment program with Italian government.
- Forms Information Technology Group (ITG) with increased emphasis on software strategy.
- TI Malaysia wins Malaysia Award for Excellence in Manufacturing.
- Awarded Microelectronics Manufacturing Science and Technology program from U.S. Air Force and Defense Advanced Research Projects Agency (now ARPA).
- TI Korea manufacturing plant opened in Chinchon.
- TI stock listed on Tokyo Stock Exchange.

1990
- Net revenues $6.6 billion; 70,318 employees.
- Forms joint venture with Kobe Steel in Japan to manufacture advanced semiconductors.
- Announces TI-2000, TI's strategic vision for the next decade (result of 1989 strategic review process).
- Develops silicon-based monolithic spatial light moderator, the digital micromirror device (DMD), for imaging applications.
- TI Taiwan wins first Taiwan National Quality Award.

1991
- Produces the first optoelectronic IC combining silicon and gallium arsenide circuits.
- Acquires European CASE business of James Martin Associates, Ltd. (JMA).
- Fabricates SuperSPARC™ 3.1 million transistor single-chip RISC microprocessor in 0.8-micron BiCMOS.
- Enters joint venture with Canon, Hewlett-Packard and government of Singapore to build advanced semiconductor fabrication facility in Singapore.
- Becomes first U.S.-based semiconductor company to open dedicated R&D facility in Japan (Tsukuba).
- Forms new international structure, naming presidents for TI Europe and TI Asia.
- Sells industrial automation and controls hardware business to Siemens.
- Completes sale of GSI to Halliburton Company.
- TI Limited (U.K.) wins Perkins Award for total involvement in quality.
- TI Singapore wins National Quality Control Circle Award.

1992
- Introduces microSPARC™ single-chip processor with all essential system logic of engineering workstation.
- Begins shipment of TI486 microprocessor.
- Introduces PRISM™ process for design of mixed-signal ICs.
- Introduces TravelMate™ 4000 notebook computer
- Sells multiuser computer systems and service business to Hewlett-Packard.
- DSEG wins Malcolm Baldrige National Quality Award (U.S.) in manufacturing category.
- M&C wins Canada Award for Business Excellence in Total Quality.
- TI Portugal wins first Portugal National Quality Award.

1993
- Announces cooperative agreement with Hitachi for development of 256-megabit DRAM.
- TI Deutschland wins first Bavarian Quality Award.
- Demonstrates first quantum-effect IC that operates at room temperature.
- Demonstrates digital projection display system using DMD technology.
- Demonstrates world's fastest cycle time (3 days) for manufacture of integrated circuit.
- Begins construction of new semiconductor manufacturing facility in Dallas.
- Establishes first electronics-industry-led university program in China.
- TI Europe adopts European Foundation for Quality Management (EFQM) criteria for quality journey.
- Office of the Chief Executive Officer established, consisting of TI Chairman Jerry Junkins and Vice Chairmen Bill Mitchell and Pat Weber.
- Strategy Leadership Team established to be focal point for key management decisions in company.